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ABSTRACT

The relationships among factors reported on a set of report cards developed for local school districts in Tennessee were studied. The analysis offers information about how selected factors relate to student outcome. Each year, Tennessee's State Board of Education produces a report card on each school district using data provided by the district and the Department of Education. Report cards contain information on student outcomes (achievement test scores) and district characteristics. The following research questions guided the study: (1) how district characteristics relate to academic achievement; (2) how district characteristics relate to each other; (3) how districts perform in terms of characteristics reported; (4) whether reported characteristics represent all factors that influence student achievement; and (5) how this study can inform educational policy. A profile of 139 Tennessee school districts was developed. The eight factors investigated accounted for only 26.5% of whatever related to mean student outcome (test scores). Significant positive correlations with achievement were found for five factors, and significant negative correlations were found for two factors. When schools were rank-ordered, money was not the most significant factor in district performance. It was apparent that the reported characteristics did not represent all the variables influencing outcome. Ways in which these findings can influence educational policy are discussed. There are nine tables of outcome data and a list of nine references. (SLD)

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STUDENT OUTCOME AND POLICYMAKING: AN ANALYSIS OF TENNESSEE'S REPORT CARDS ON SCHOOLS

(Why Do We Bet on .25 When .75 Is Running Loose?)

Paper submitted for Annual AASA Outstanding Research Competition

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**STUDENT OUTCOME AND POLICYMAKING: AN ANALYSIS OF TENNESSEE'S
REPROT CARDS ON SCHOOLS
(Why Do We Bet on .25 When .75 Is Running Loose?)***

I. INTRODUCTION

Currently, there is great interest in such things as accountability based on student performance and communicating to school constituencies the achievements of students in school districts and in individual schools. "Report cards" on schools have become common in many states, and that concept is imbedded in the education agenda. However, little attention has been given to the value and uses of "report card" data.

In Tennessee (TN) a report card on schools contains data on student academic achievement (test scores), educational expenditures, community per capita income, student enrollments and attendance, professional personnel and salaries, average class sizes and other factors deemed important to understanding education in the community and in providing comparisons with other schools or districts in the state and region. Generally, a reader does not know what relationship the entries have to each other or to student achievement, which is considered the "bottom line." The inclusions tend to imply that the factors reported at least strongly influence, student achievement but that relationship is rarely stated or investigated.

The purpose of this research was to study the relationships among factors reported on one set of report cards—those developed for local school districts within TN. The analysis offers information about how the selected factors relate to student outcomes. The information should be of value to policymakers and educators as they attempt to determine where and how to allocate resources (money, personnel, etc.), and as they develop or refine report cards.

America 2000 (1991) is focusing attention on a national strategy for education. Part of that strategy is report cards (see pp. 12 and 27), an idea probably initiated by (then) Education Secretary Bennett's "Wall Chart" idea in 1984. Since that time, some states have adopted the report card idea for districts, and some districts use report cards with individual schools. Report-card complexity and the sophistication of use vary. There has been little exploration of the use, value, relevance, etc. of report cards, at least as they have been used. This study used the report card process and data from one state (Tennessee, or TN).

II. TENNESSEE'S (TN) REPORT CARDS (1988-1989)

Each year, Tennessee's State Board of Education produces a report card on each school district using data provided by the district and by the State Department of Education. The cards report district-level data; i.e., individual school data are not reported. Currently, a report card contains student outcome data (testing information) and other district data. Tables 1 and 2 display the "Widget" city (TN) school district report card.

* *Would you bet on this in Las Vegas?*

Table 1 Testing information for Widget City Schools. Similar achievement data are found on the typical Tennessee School district's Report Card.

Testing Information for Widget City		Grade Level	1987-88	1988-89	State Average
Basic Skills First Achievement Test (percent score)	Reading	3	90	88	80
		6	82	80	77
		8	92	91	81
	Math	3	91	90	82
		6	67	71	66
		8	77	84	66
Stanford Achievement Test (Stanine score) 7-9 = High 4-6 = Average 1-3 = Low	Reading	2	6	7	6
		5	6	6	5
		7	6	6	5
	Math	2	7	8	6
		5	7	6	6
		7	7	7	5
	Spelling	2	6	7	6
	Language	5	6	6	5
		7	6	6	5
	Environment	2	7	7	6
	Science	5	6	7	6
		7	6	6	5
	Listening	2	7	7	5
		5	6	6	5
		7	6	6	5
	Social Science	5	6	6	5
		7	6	6	5
Stanford Test of Academic Skills (TASK 2) 7-9 = High 4-6 = Average 1-3 = Low	Reading	9	6	6	5
		12	6	6	5
	Math	9	6	6	5
		12	6	6	5
	English	9	7	6	5
		12	6	7	5
	Science	9	7	6	5
		12	6	6	5
	Social Science	9	5	6	5
		12	6	5	5
Tennessee Proficiency Test (% Students Passing)	Language	9	88	92	78
	Math	9	95	98	90
	Both	9	86	91	76

Table 2. General information found on a typical school district's report card.

System Information for Widget City		Grade Level	1986-87	1987-88	1988-89	State Average
Number of Schools		K-12	5	5	5	12
Average Daily Membership		K-12	3,291	3,394	3,372	5,874
% Student Attendance		K-12	95.7	95.3	95.1	93.6
% Enrollment Change		9-12	-13.0	-16.1	-15.2	-24.7
% Oversized Class		K-12	1.2	1.4	2.3	3.8
% of Students on Free or Reduced Price Lunch		K-12	23	21	21	42
Expenditures per pupil		K-12	\$2,718	\$3,299	\$3,501	\$3,304
County Per Capita Income		K-12	"	"	\$12,819	\$12,878
% Elementary Schools Accredited by SACS		K-8		100.0	100.0	29.1
% Secondary Schools Accredited by SACS		7-12	100.0	100.0	100.0	64.9
Professional Educator Information						
% Professionals on Career Ladder Levels II & III		K-12	22.9	21.9	25.6	14.8
Average Professional Salary		K-12	\$25,198.60	\$26,085.44	\$30,804.37	\$26,756
Student Information						
% Diplomas Granted	Regular	12	90.6	68.7	75.8	81.8
	Honors	12	49.6	26.7	20.0	8.5
	Special Education	12	1.8	1.4	1.5	1.9
	Certificate of Attendance	12				0.9
	Seniors not Receiving Diploma in Spring Graduation	12	2.7	3.2	2.7	6.9
% Students in Vocational Education Courses		7-12	33.0	40.9	41.0	45.5
% Students in Special Education		K-12	12.1	11.3	12.1	14.2
% Chapter 1 Students		K-12	13.3	15.5	12.4	11.9

Data are organized under two sections: (1) Testing information, and (2) System Information for "Widget" City. The second section includes: (1) System Information, (2) Professional Educator Information, and (3) Student information.

Testing information for four sets of tests (in 1988-89) is organized under four headings: grade level, the prior school year (1987-88), the present school year (1988-89), and state average. School System information is organized under five headings: grade level, two years prior data (1986-87) and (1987-88), present year (1988-89), and state average. Testing information is defined as follows (with abbreviations used in this paper):

- a. **Basic Skills First Achievement Test (BSF)** *The BSF is a state-developed criterion-referenced test administered to students in grades 3, 6, and 8 to measure how well students have mastered reading and mathematics skills. Scores show the average percent of skills mastered by students in system. This study used the 1989, 8th-grade data.*

- b. **Stanford Achievement Test (SAT)** The SAT was administered in grades 2, 5, 7 and reported in stanines. The SAT was discontinued (1989) and replaced by the STAS (Task 2). This study did not use the now discontinued SAT in the analyses.
- c. **Stanford Test of Academic Skills (TASK 2) (STAS)** The STAS is administered in grades 2, 5, 7, 9, and 12. These tests show how students perform when compared to students at the same grade nationwide. These scores are reported as stanines, scores from one to nine, where one is low and nine is high. An average score is four, five, or six. These scores show the average stanine on each part of the test for the students in the system. This study used the 1989, 12th-grade data.
- c. **Tennessee Proficiency Test (TPT)** The TPT measures minimum skills in mathematics and language arts. Students must achieve a passing score of 70 percent correct on both the math and language arts tests in order to fulfill one of the requirements for receiving a regular diploma. Students take the test for the first time in the ninth grade. This study used the 1989, 9th-grade data.

Seven of the eight categories of report card information used for this study are defined by report card developers (Average Daily Membership was not specifically defined): The definitions are:

- a. **County per Capita Income (CCI)** This figure represents the per capita personal income for the county in which your school system is located. The most recent figures available from the U.S. Bureau of Economic Analysis are for 1987.
- b. **Average Professional Salary (APS)** This figure shows the *estimated* average salary for all certificated personnel in your school system.
- c. **Expenditures per Pupil (EPP)** This figure shows the average number of dollars spent for each pupil in average daily attendance for your school system.
- d. **Average Daily Membership (ADM)** (The *Report Card* did not provide a definition for this category).
- e. **Percent of Students in Attendance (%SA)** This figure shows the average percent of students in attendance daily in the individual school districts for the school years 1986-87, 1987-88, 1988-89.
- f. **Percent of Oversized Classes (%OC)** This figure shows the percent of classes in all grade levels which had waivers for being over the maximum class size. Maximum class sizes in Tennessee are: 25 for grades K-3, 28 for grade 4, 30 for grades 5-6, 35 for grades 7-12, and 23 for vocational (1989).
- g. **Percent of Students on Free or Reduced Lunches (%FRL)** Students whose family income meets certain criteria are eligible for free or reduced price lunches. This figure shows the percent of students in your school system who receive free or reduced price lunches.
- h. **Percent Professionals on Career Ladder Levels II and III (%CL)** This figure shows the percent of professional staff in your school system who have met the standards for Career Levels II and III. These are the upper rungs of Tennessee's Career Ladder program. The number includes regular classroom teachers, guidance counselors, librarians and administrators.

The investigators chose the above eight categories (including ADM) and test results for detailed study.

Many educators and lay persons believe that these factors influence student academic performance.

III. METHODOLOGY

Investigators used the 1988-89 report card data for the study. Although the report cards provided test results at several grade levels, only the average scores for the highest grade levels reported were used in these analyses. Those scores were considered as best representing the final product of the school system. Five research questions guided the study:

1. How do school district characteristics currently reported in the report cards relate to reported student academic achievement?

2. How do reported school district characteristics relate to each other?
3. When rank ordered on the basis of student outcomes, how do school districts within the state perform in terms of the district and community characteristics reported in the report card?
4. Do the reported school district characteristics appear to represent all or most factors that influence student academic achievement?
5. How might the findings of this study inform educational policy at state and local levels?

Investigators treated student outcome data (test data) as the dependent variable and other characteristics reported as independent variables that influence student outcomes. Several analyses were conducted.

First, a composite of all school districts in the state (n=139) was produced, as was a composite of the 121 school districts constituting the final sample. These provided a statewide picture and helped researchers to determine if the study sample (n=121) varied in any significant way from the state composite.

To answer research question #1, three analyses were conducted. First, a linear regression assessed the relationship between each reported characteristic and the school district's mean student outcome. The researchers combined three sets of reported test scores to create a mean student outcome (MSO) measure for each school district. To create the MSO, the mean scores reported for each test were first converted to z-scores (see Nunnally, 1978, pp 24-34) that were used to compute the MSO. Only school districts (n=121) reporting scores for all three tests (8th grade BSF; 12th grade STAS; and 9th grade TPT) were in the final sample. A Pearson Product Moment correlation was developed as a means of comparing categories.

The second analysis for question #1 used two procedures. First, report card information was reorganized into three clusters: testing, money, and school system information. That structure is outlined below:

1. Testing information (combined into the MSO)
 - Basic Skills First Achievement Test (BSF)
 - Stanford Test of Academic Skills (Task 2) (STAS)
 - Tennessee Proficiency Test (TPT)
2. Money Information
 - County per Capita Income (CCI)
 - Average Professional Salary (APS)
 - Expenditure Per Pupil (EPP)
3. School System Information
 - Average Daily Membership (ADM)
 - Percent of Students in Attendance (%SA)
 - Percent of Oversized Class (%OC)
 - Percent of Students on Free or Reduced Lunches (%FRL)
 - Percent of Professionals on Career Ladder Levels II and III (%CL)

The purpose of this clustering was to facilitate investigation of the interactions of multiple, related categories with student outcomes and with each other. Data for categories clustered as "Money" or "School System" were converted to z-scores, then the Pearson Product Moment correlation was applied.

The third analysis employed Guttman's partial correlation procedure. The partial correlations for each category were converted to percentages of influence, thereby enabling investigators to determine the relationship of each independent variable (category) to the dependent variable (MSO).

To answer research question #2, investigators computed correlations among independent variables (categories in the Money and School System clusters). A *coefficient of determination* (r^2) showed the levels of interaction between categories within a cluster and across clusters.

Research question #3 required the rank ordering of school districts within the sample by mean student outcome. The investigators then focused attention on the nine districts with the highest MSOs and the nine with the lowest MSOs.

Research question #4 required no further statistical analyses. The partial correlation coefficients and related percentages of influence previously developed provided the necessary data.

Research question #5 provided a focus for conclusions and implications of the study. Report cards on schools and the demographic data reported in them may reflect unstated assumptions about relationships. If the findings of this study have any value, it may well be the informing of policymakers and policy.

IV. FINDINGS

Findings of the study are reported in two areas: (A) descriptive analyses of school districts and (B) responses to the research questions.

A. Descriptive Analyses of School Districts

1. The 1988-89 Profile of TN's 139 School Districts

A profile of TN school districts ($n=139$) by Report Card category was developed (see Table 3). For each category, the report card (state) mean score, standard deviation (SD), number of schools submitting data and ranges of scores or numbers were compiled.

a. Outcome Data

Of the 139 TN school districts, 96% reported BSF scores, 89% reported TPT scores, and 87% reported STAS scores. An average of 81% of all students taking the 8th grade BSF in 1988-89 passed the Reading sub-test, and 66% passed the mathematics component. Just over 76% of all students completing the TPT passed both the mathematics and language components. More students passed the mathematics sub-test (90%) than the Language component (76%), a reversal of the results on the BSF, usually given a year earlier. In 1988-89, the mean scores of 12th grade students taking the STAS was near the 5th stanine (4.8-5.3) on all five sub-tests. Scores on all three tests ranged from several SDs below to several above the mean.

Table 3. A "Report Card" Profile of Tennessee's 139 School Districts in 1988-89.

139 SCHOOL DISTRICTS					
	SD	n	Max	Min.	Report Card Mean
OUTCOMES					
Basic Skills First (BSF)					
			<u>(Percent passing): 8th grade</u>		
Reading	4.9	134	93	65	81
Math	7.6	134	85	43	66
Stanford (STAS); Task 2					
			<u>(Stanine score): 12th grade</u>		
Reading	.5	121	7	4	5
Math	.5	121	6	4	5
English	.6	121	7	4	5
Science	.5	121	6	3	5
Social Studies	.5	121	6	4	5
TN Proficiency Test (TPT)					
			<u>(% Students passing): 9th grade</u>		
Language	7.1	124	98	56	76
Math	6.4	124	100	59	90
Both	9.4	124	98	48	76
MONEY					
Co./Capita Income (\$) (CCI)	2,030	139	19,318	6,934	12,878
Expenditure Per Pupil (\$) EPP)	505	139	4,891	2,163	3,304
Aver. Prof. Salary (\$) (APS)	2,683	139	34,796	21,015	26,756
SCHOOL SYSTEM					
Average Daily Mem. (#) (ADM)	11,702	139	104,788	188	5,874
Student Attendance (%SA)	1.3	139	97.1	90.3	93.6
Oversized Class (%OC)	4.6	122	21.5	0.1	3.8
Free/Reduced Lunch (%FRL)	4.3	139	86.0	9.0	42.5
Career Ladder II/III (%CL)	6.1	138	41.5	4.1	14.8

b. Money Matters

In the **Student Expenditure Per Year** category, students in the richest school district were supported by \$4,891 per year and the students in the poorest district by \$2,163 per year, a \$2,728 per year difference between the richest and poorest districts. The mean **County per Capita Income** was \$12,878, with a range from \$19,318 to \$6,934 (an approximate 300% difference). The **Average Professional Salary** mean was \$26,756, with a range from \$34,796 to \$21,015.

c. School System characteristics

All TN districts provided **Average Daily Membership (ADM)** category data. The average school district's daily attendance was 5,874 students. The largest district had 104,778 students and the smallest district had 188 students. The percent of **Student Attendance (%SA)** for the top school district in this category was two SDs above the mean and for the bottom school district, two SDs below the mean. The top district had 97%

attendance and the lowest district had 90% attendance—a 7% difference. Percent of **oversized classes** (%OC) was reported by 122 school districts. State class size restrictions in 1988-89 were 25 students in grades K-3, 28 students in grade 4, 30 students in grades 5-6, 35 students in grades 7-12, and 23 students in vocational classes. An oversized class was any class exceeding these numbers. The percentage of oversized classes reported ranged from 0.1% to 21.5%.

Students participating in the **Free or Reduced Lunch** (%FRL) program in 1988-89 ranged from a low of 9% to a high of 86%. This category is one common (but usually understated) indicator of the socio-economic status (SES) level of families served by the school.

Tennessee has an operational career ladder programs for professional educators (teachers, administrators, other). Since 1984, educators have been able to apply for evaluation for levels I, II, and III on the Career Ladder and receive merit pay as well as extended contract opportunities, if they achieve the upper rungs (Levels II, III). In 1988-89, approximately 15% of all educators had achieved **Career Levels II and III** (%CL). Percentages of educators at these levels in individual school districts ranged from 4% to 42%.

2. Descriptive Analysis of 121 TN School Districts Reporting Necessary Student Outcome Data

Student outcomes were a major focus of this study, so school districts that did not report all three sets of test scores were excluded from further investigation. Of 139 school districts, 121 provided all necessary student test data. The profile for these 121 districts was like that of the total 139 districts (see Table 4). Mean County/district per capita income dropped 75 dollars. Average expenditure per pupil rose 19 dollars. Average professional salary fell 84 dollars. Average membership rose 689 students. Oversized classes dropped 0.4%. Students in the free or reduced lunch program rose 0.5%, and career levels II and III teachers dropped 0.2 %.

B. Findings Pertinent to Research Questions *(All correlations appear in the correlation matrix, Table 5)*

1. How do school district characteristics currently reported in the report cards relate to reported student achievement?

A linear regression model was used to assess the relationship between each reported characteristic and the school district's mean student outcome (MSO). In addition, by using the state mean and MSO, outlier school districts were identified. Below are the results of this analysis reported by characteristic.

a. Influence of County Per Capita Income (CCI)

Figure 1 shows a positive correlation between MSO and CCI. The regression line intercepts the MSO zero z-score mean at \$11,000, a point \$1,800 below the state average per capita income of \$12,878. Generally, districts with greater CCI demonstrated higher MSO ($r=.31$). However, it should be noted that most (i.e., $\approx 9:1$ ratio) school districts' per capita income falls below the reported state mean (\$12,878).

Table 4. A Report Card Profile of 121 Tennessee School Districts sampled.

121 SCHOOL DISTRICTS

	<u>SD</u>	<u>n</u>	<u>Max</u>	<u>Min.</u>	<u>Report Card Mean</u>
OUTCOMES					
Basic Skills First (BSF)					
			<u>(Percent passing): 8th grade</u>		
Reading	4.9	121	91	65	81
Math	7.7	121	85	43	66
Stanford (STAS); Task 2					
			<u>(Stanine score): 12th grade</u>		
Reading	0.5	121	7	4	5
Math	0.5	121	6	4	5
English	0.6	121	7	4	5
Science	0.5	121	6	3	5
Social Studies	0.5	121	6	4	5
TN Proficiency Test					
			<u>(% Students Passing): 9th grade</u>		
Language	8.6	121	98	56	76
Math	6.4	121	98	59	90
Both	9.3	121	98	48	76
MONEY					
Co./Capita Income (\$) (CCI)	1,962	121	19,318	6,934	12,878
Stud. Expenditure (\$) (EPP)	509	121	4,891	2,318	3,304
Aver. Prof. Salary (\$) (APS)	2,693	121	34,797	21,286	26,756
SCHOOL SYSTEM					
Average Daily Mem. (#) (ADM)	12,395	121	104,788	375	5,874
Student Attendance (%SA)	1.3	121	97.1	90.3	93.6
Oversized Class (%OC)	4.1	110	21.5	0.1	3.8
Free/Reduced Lunch (%FRL)	14.5	121	86.0	9.0	42.0
Career Ladder II/III (%CL)	5.9	121	41.5	4.1	14.8

Even while a positive relationship between CCI and MSO was demonstrated, there were "outlier" districts; i.e., districts that did not follow the trend. Four districts had CCIs at least \$2,000 below the state mean, but had MSOs at least one standard deviation above the mean. One of these districts had a per capita income almost \$6,000 below that mean. All other figures are in the same format as Figure 1.

b. Influence of Average Professional Salary (APS)

The significant positive correlation between size of APS and MSO ($r=.44$) was the highest positive correlation for the three money categories. The mean APS in 1988-89 was \$26,756, with a range from \$21,000 to \$35,000 (see Figure 2). Most school districts (=4:1 ratio) have a smaller APS than the state mean of \$26,756.

Generally, school districts with higher APS demonstrated higher MSO's. However, this category also

Table 5. Correlation Matrix for testing, money, and school system categories (Pearson).

		Outcome				Money			School System			
		BSF	STAS	TPT	MSO	CCI	APS	EPP	ADM	%SA	%OC	%FRL
Outcome	BSF	1										
	STAS	.358	1									
	TPT	.387	.438	1								
	MSO	.753	.770	.793	1							
Money	CCI	.140	.368	.219	.313	1						
	APS	.214	.528	.272	.436	.706	1					
	EPP	.081	.354	.087	.223	.437	.783	1				
	ADM	-.146	-.000	-.061	-.090	.529	.410	.330	1			
School System	%SA	.403	.117	.418	.407	.063	.042	-.138	-.155	1		
	%OC	-.235	-.294	-.174	-.302	-.356	-.458	-.390	-.198	-.203	1	
	%FRL	-.347	-.422	-.362	-.488	-.533	-.372	-.003	.063	-.259	.191	1
	%CL	.188	.317	.214	.310	.338	.468	.266	.025	.209	-.348	-.321

p .01 = Bold

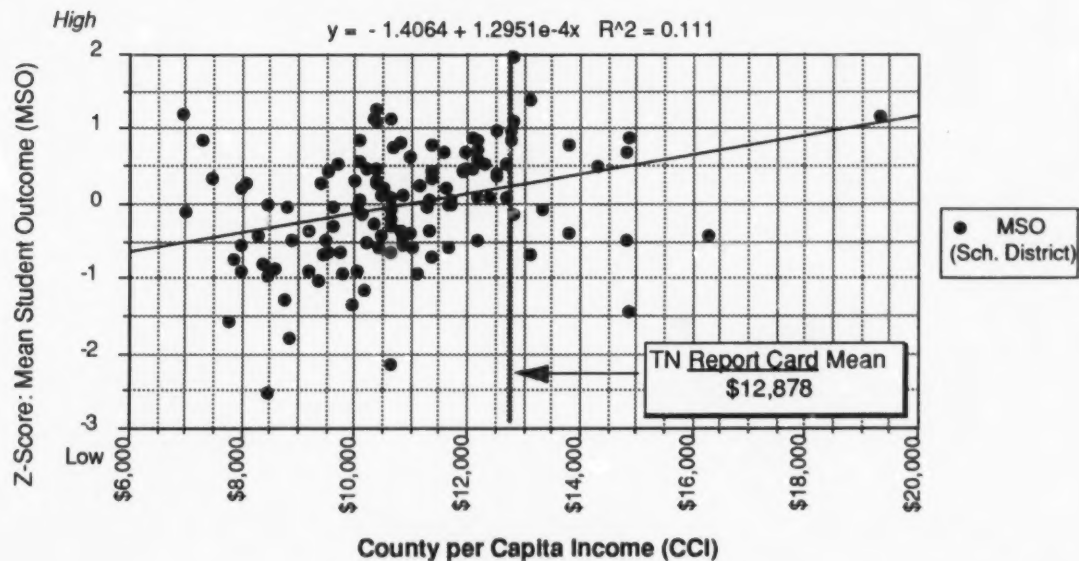


Figure 1. Relation of Per Capita Income to Mean Student Outcome.

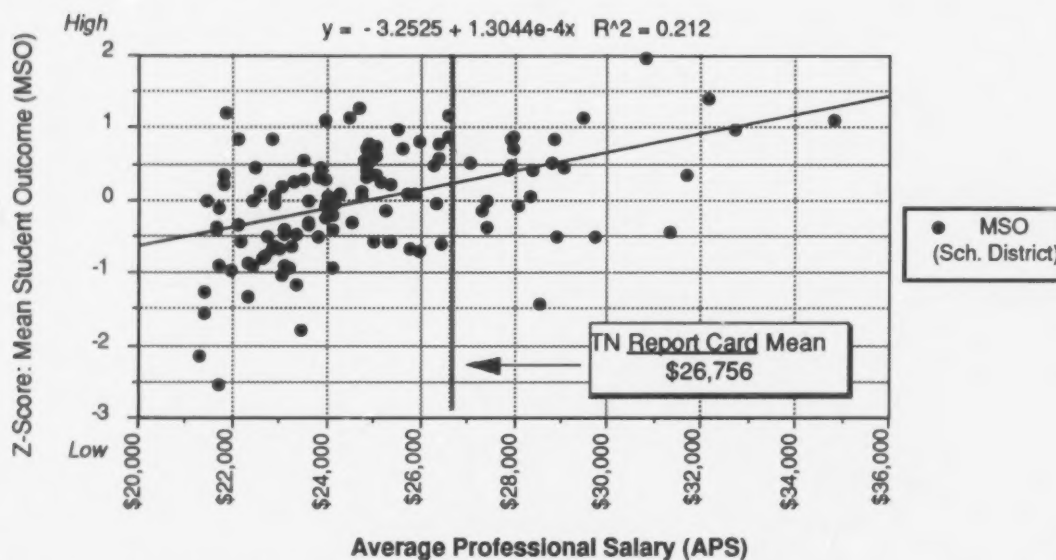


Figure 2. Relation of Average Professional Salary to Mean Student Outcome.

displayed "outlier" school districts. One of the nine districts with the highest MSOs in the state had an APS of less than \$22,000; another's APS was \$24,000, and two others were under \$25,000. Of the nine districts with the lowest MSO z-scores, all but one were below the APS state average.

c. Influence of Expenditure Per Pupil (EPP).

The majority of TN school districts did not expend the state mean EPP of \$3,306 (≈4:1 ratio). The trend line in Figure 3 shows a small positive correlation between MSO and EPP. The EPP correlation ($r=.22$) with MSO was the smallest of the three money category correlations (see Table 5, p 10).

While districts with higher EPP tended to have slightly higher MSOs than other districts, six of ten districts with MSOs at or exceeding one SD above the mean were below the state mean in EPP. Two of those districts spent at least \$500 less than the mean, and four spent at least \$400 less. For every TN school district above the mean EPP, four were below the EPP mean (see Figure 3).

d. Influence of Average Daily Memberships (ADM).

There was no significant correlation between school district size (ADM) and MSOs. The slight correlation was negative ($r= -.09$); larger district size tended to influence MSO negatively.

The state mean ADM of 5,874 students per district was influenced by a few large school districts, since most districts clustered below that mean (three districts below for every one above—see Figure 4). In actuality, 83% of TN school districts reported fewer than 15,000 students. Only 10 districts had enrollments above that figure, and two districts had very large enrollments.

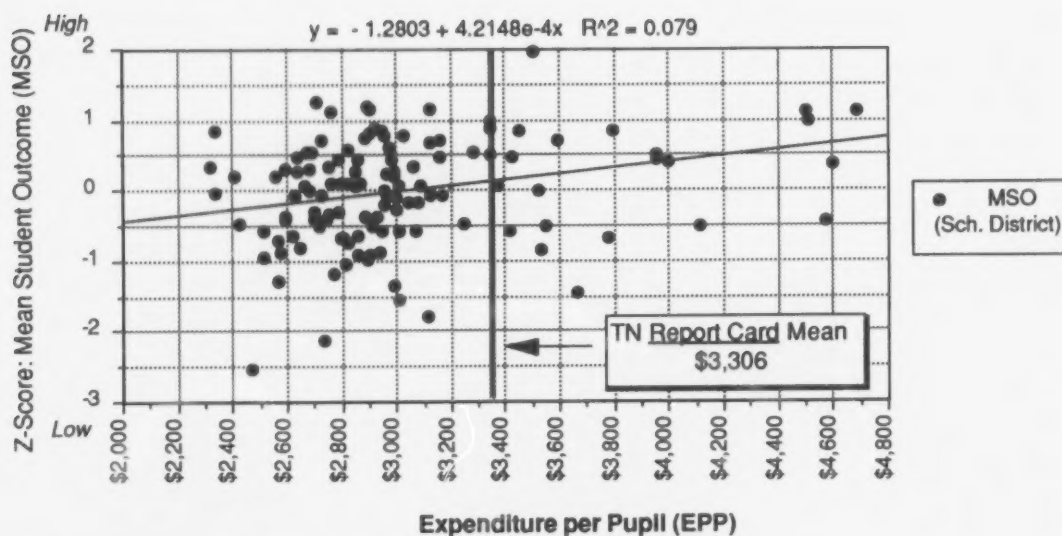


Figure 3. Relation of Expenditure Per Pupil to Mean Student Outcome.

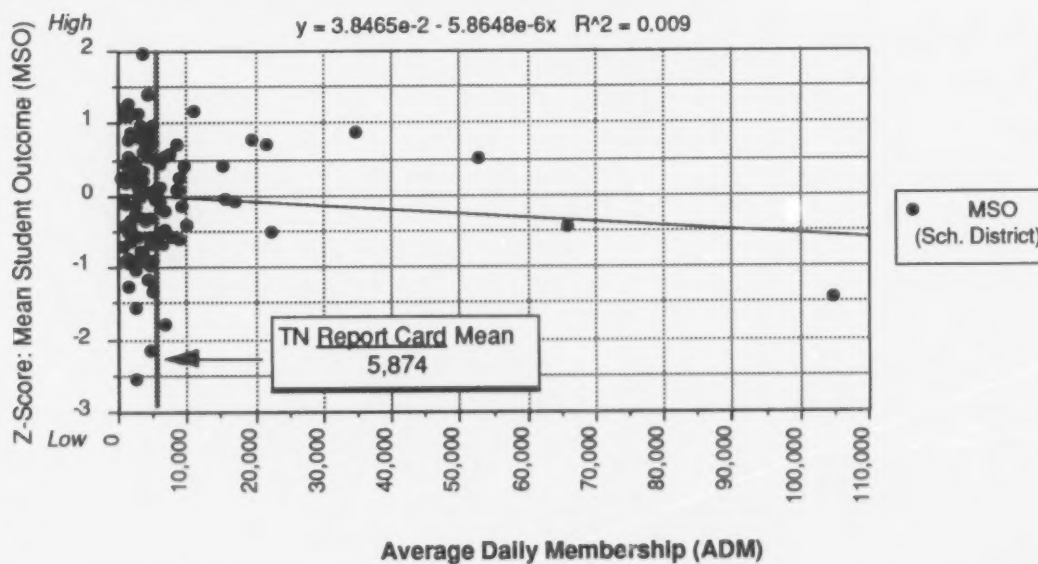


Figure 4. Relation of Size of School District (Average Daily Membership) to Mean Student Outcome.

e. Influence of Student Attendance (%SA)

A significant, positive correlation ($r=.41$) existed between %SA and MSO (see Table 5, p 10). Generally, where average daily attendance was greater, achievement was higher.

State average student attendance in 1988-89 was 93.6% (Figure 5). Most districts exceeded this average (ratio of ≈ 7 to 4). All districts where attendance averaged 92% or less demonstrated MSO z-scores at or below zero; 6 of 8 districts where average attendance exceeded 96% had positive MSO z-scores.

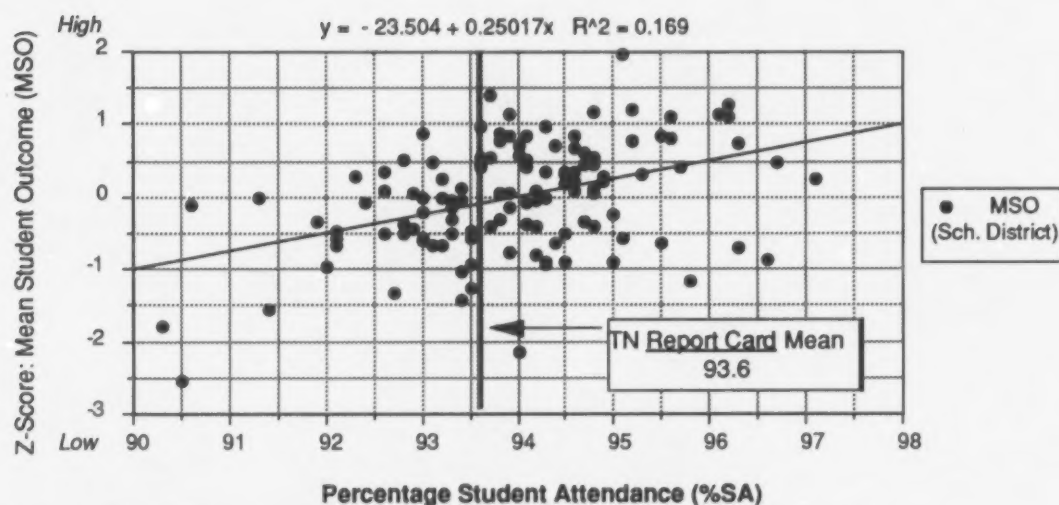


Figure 5. Relation of Percentage of Student Attendance to Mean Student Outcome.

f. Influence of Oversized Class (%OC)

Of the 121 school districts studied, 110 reported oversized class data. There was a significant, negative correlation between %OC in a district and MSO ($r = -.30$) (see Table 5, p 10). Generally, districts with larger numbers of oversized classes had lower MSOs and vice versa.¹ Low %OC is a high (good) (e.g., 1, 2) rank.

Among the 110 school districts reporting %OC, the average percentage of classes exceeding regulations size was 3.8 (see Figure 6). Of the nine school districts with MSO z-score of negative one SD or below, seven exceeded the average percentage of oversized classes. Of the 9 school districts with an MSO z-score of plus one or above, only 3 exceeded the state average (3.8%). No fewer than 37 districts that reported more than 3.8%OC demonstrated MSOs at or above the state mean. Fifteen districts reporting a %OC below 3.8% also had MSO z-scores below zero. The impact of class size cannot be simply interpreted.

g. Influence of Free or Reduced Lunch as Socio-Economic Status Indicator (%FRL)

The percentage of free and reduced lunches (FRL) was one indicator of socio-economic status (SES) of the community; the higher %FRL, the lower the SES of the community. There was a significant negative correlation between %FRL and mean student outcome ($r = -.49$). School districts with lower percentages of free and reduced lunches generally had higher MSO z-scores. Low FRL rank (e.g., 1 or 2) is few %FRL pupils.

The statewide average %FRL was 42%. However, two-thirds of all school districts reported percentages of

¹ This is an interesting finding considering the results of Tennessee's massive, four-year longitudinal/class-size study, Project STAR, which showed convincingly the benefits to student achievement of reduced class size (to 1:15) in primary grades (Finn & Achilles, 1990; Word, et. al., 1990). STAR, however, assessed grades K-3; this present analysis reviewed grades 9-12.

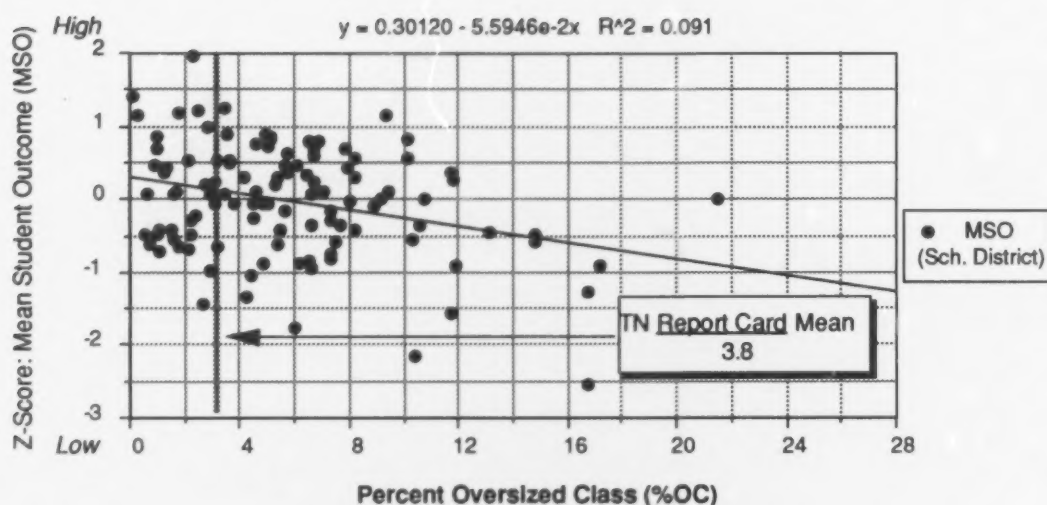


Figure 6. Relation of Percent Oversized Class to Mean Student Outcome.

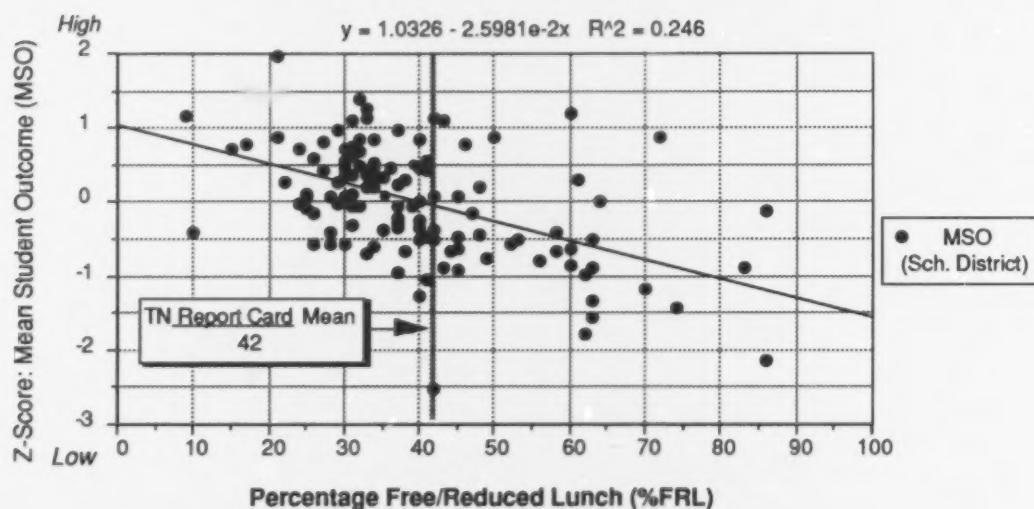


Figure 7. Relation of Percentage Free or Reduced Lunch to Mean Student Outcome.

%FRL below the state average (see Figure 7). Seven of the nine districts with MSO z-scores of negative one SD or below had larger %FRL than the state average, and five of the six school districts with the highest %FRL demonstrated negative MSO z-scores. Alternatively, seven of the nine districts with MSO z-scores of plus one or higher had lower than state average %FRL. However, in this category, as in others, there were "outlier" districts. Two of the nine districts with MSO z-scores above plus one were above the state average for %FRL; one had 60% of its students on free and reduced lunches.

h. Influence of Percentage of Career Ladder (%CL) Teachers

Since TN's Career Ladder program is intended to identify and to reward outstanding teachers, a high percentage of Career Ladder II & III teachers in a school district should indicate good instruction (*and high MSO*) in that district. Low percentages of Career Ladder II & III teachers did not necessarily suggest poor instruction, because the Career Ladder program is optional.

There was a significant but modest positive correlation between %CL teachers in a district and MSO ($r=.31$). The trend line in Figure 8 suggests that the greater the %CL teachers, the higher the MSO. The four school districts with the lowest MSO z-scores also had low %CL teachers.

The average percentage of upper-level Career Ladder teachers statewide was 14.8%, and slightly more districts reported percentages below that average than above (a $\approx 7:5$ ratio). While seven of the ten districts generating the highest MSO z-scores reported greater %CL teachers than the state average, there were also "outlier" districts. The district with the highest %CL teachers had a MSO well below the state mean. Greater %CL of teachers was not a guarantee of better student performance. Also, Career Ladder status is not independent of years of teaching experience.

i. Relationships of the Money and School System Clusters to Mean Student Outcome (MSO).

The three Money characteristics (*per capita income, per pupil expenditure, and average professional salary*) when combined, produced a significant positive correlation ($r=.41$) with MSO (see Figure 9). This finding is not surprising since each characteristic individually provided a positive correlation.

However, four school districts with money z-scores below zero produced MSOs at least one SD above the

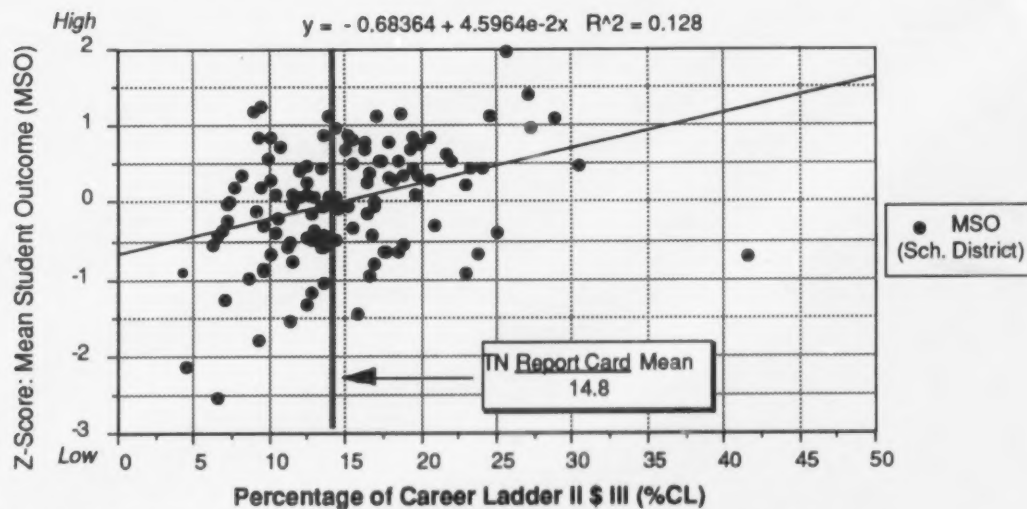


Figure 8. Relation of Percentage of Career Ladder Teachers to Mean Student Outcome.

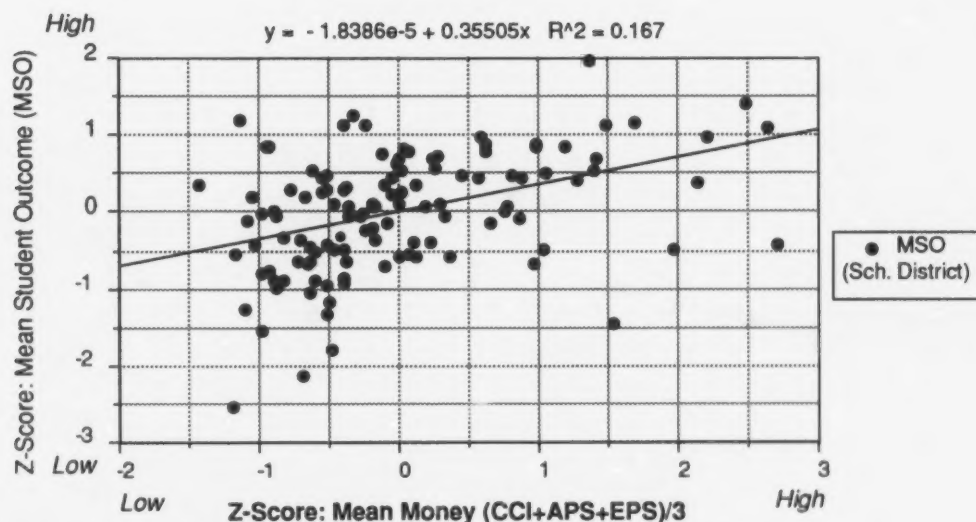


Figure 9. Relation of Combined Money Factors to Mean Student Outcome.

state mean, and one school system with a money z-score one and one-half SDs above the mean produced a MSO one and one-half SD below the mean.

Data in Figure 10 show that the five school system factors (*percent student attendance, percentage of free or reduced lunches, percentage of oversized classes, percentage of Career Ladder teachers and average daily membership*), when combined, produced a moderately high, significant positive correlation ($r=.50$) with MSO. Based on the sizes of the correlation coefficients, one could say that these school system characteristics relate to MSOs more than do the reported money factors. While fiscal resources are important to student achievement, this finding suggests that other factors within a school district may be equally or more important.

Of the eight factors (see Table 5, p. 10) studied for their relationships to MSO, five demonstrated significant ($p \leq .01$) positive correlations and two factors yielded significant negative correlations with MSO:

1. Average Professional Salary or APS ($r=.44$)
2. Percent Student Attendance or %SA ($r=.41$)
3. County Per Capita Income or CCI ($r=.31$)
4. Percentage of Career Ladder Teachers II & III or %CL ($r=.31$)
5. Expenditure Per Pupil or EPP ($r=.22$)
1. Number (percent) of Free or Reduced Lunches or %FRL ($r= -.49$)
2. Number (percent) of Oversized Classes or %OC ($r= -.30$)

Size of School District (Average Daily Membership or ADM) did not show a significant correlation with MSO.

J. Partial Correlation to try to Isolate Factors.

These individual correlations do not fully answer research question #1. To refine the response, Guttman's

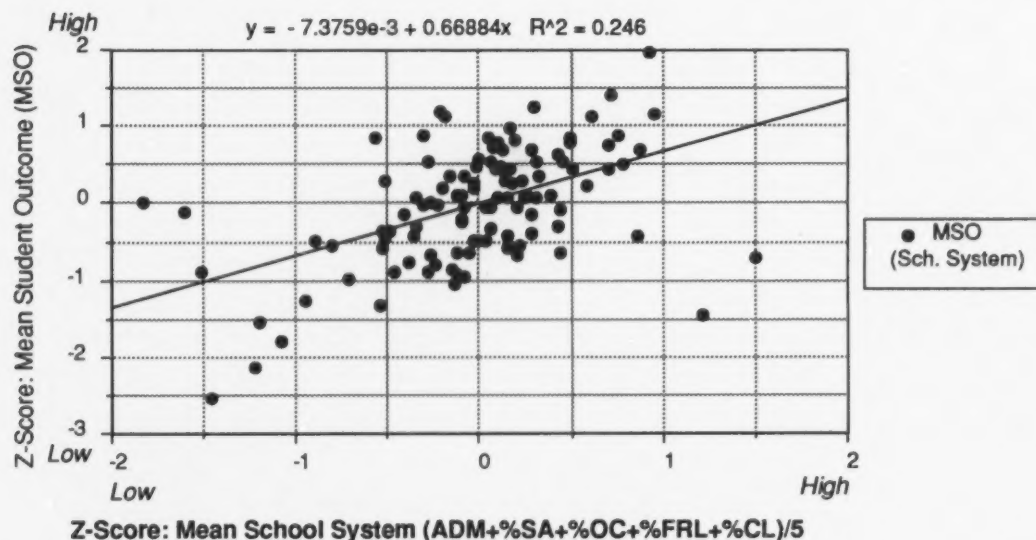


Figure 10. Relation of School System Factors to Mean Student Outcome.

partial correlation procedure was used (i.e., The *Kaiser* was run and the total matrix sampling adequacy was greater than .500 so that Guttman's assumptions were met). The resulting matrix is shown in Table 6 (see p 18).

The partial correlation coefficients were converted to percentage of influence (PI) as displayed in Table 7 (see p 18). Several trends emerge from this analysis. First, the eight factors investigated account for only 26.5% of whatever relates to MSO, a fact discussed in more detail in response to research question #4.

Of the 26.5% influence on MSO exerted by the combined money and school system variables, almost 11% was provided by student attendance. A student's school learning and achievement are influenced by his/her presence in school (*time on task*). Six percent of the association with MSO was produced by socio-economic status of the community (%FRL); 5.6% was attributable to APS. The %OC accounted for only .6% of the MSO results; affluence of the community (CCI) contributed only .4% of the influence, and %CL contributed .2%. The EPP alone showed essentially NO association (.003) with MSO. Implications of these findings are discussed in response to research question #5.

2. How Do Reported School District Characteristics Interact with Each Other?

To determine the interaction of money and school system factors, they were correlated with each other. As demonstrated in Table 5 (p 10), significant ($p \leq .01$) correlations resulted for 17 of 28 combinations.

Significant positive correlations occurred between these nine factors:

- | | | | |
|----------------|-----------|----------------|-----------|
| a. CCI and APS | $r = .71$ | f. APS and ADM | $r = .41$ |
| b. CCI and EPP | $r = .44$ | g. APS and %CL | $r = .47$ |
| c. CCI and ADM | $r = .53$ | h. EPP and ADM | $r = .33$ |
| d. CCI and %CL | $r = .34$ | i. EPP and %CL | $r = .27$ |
| e. APS and EPP | $r = .78$ | | |

Table 6. Guttman's Partial Correlation matrix for MSO and the other Tennessee 1989 Report Card categories.

	Z: MSO	Z: CCI	Z: APS	Z: EPP	Z: ADM	Z: %SA	Z: %OC	Z: %FRL	Z: %CL
Z: MSO	.444								
Z: CCI	-.061	.707							
Z: APS	.236	.295	.839						
Z: EPP	-.003	-.007	.741	.735					
Z: ADM	-.166	.506	.211	-.151	.493				
Z: %SA	.330	.01	.005	-.188	-.057	.266			
Z: %OC	.076	.043	.033	.146	.071	.176	.283		
Z: %FRL	.244	.499	.24	-.394	-.391	-.008	-.005	.586	
Z: %CL	-.040	.018	.299	-.127	-.166	.105	.163	.024	.312

Table 7. Partial correlations and percentage of influence (PI) of each category on mean student outcome.

	r	r ²	PI (%)
Money			
County per Capita Income (CCI)	-.061	.004	0.4
Average Professional Salary (APS)	.236	.056	5.6
Expenditure per Pupil (EPP)	-.003	.00	0.0
School System			
Average Daily Membership (ADM)	-.166	.028	2.8
Percent Student Attendance (%SA)	.330	.109	10.9
Percent Oversized Class (%OC)	.076	.006	0.6
Percent Free/Reduced Lunch (%FRL)	.244	.060	6.0
Percent Career Ladder II & III (%CL)	-.040	.002	0.2
TOTAL	—	---	26.5%

Significant negative correlations occurred between the following eight factors:

- | | | | |
|-----------------|---------|-----------------|---------|
| a. CCI and %FRL | r= -.53 | e. CCI and %OC | r= -.36 |
| b. APS and %OC | r= -.46 | f. %OC and %CL | r= -.35 |
| c. EPP and %OC | r= -.39 | g. %FRL and %CL | r= -.32 |
| d. APS and %FRL | r= -.37 | h. ADM and %FRL | r= -.26 |

Most of these correlations are not surprising. Several relationships demonstrated in the negative correlations reflect "common sense." Since oversized classes and low socio-economic status of the community as portrayed in high %FRL are generally perceived to have negative impact on educational outcomes (e.g., MSO), the correlations reinforce these perceptions and show the extent of their impact on other aspects of the educational enterprise. It seems reasonable that CCI, higher %FRL, and larger %OC go hand-in-hand. Lower EPPs usually are associated with larger %OC. Professional salaries are often lower in communities with fewer financial

resources—communities where %OC and %FRL will be larger. Nor is it surprising that greater %CL teachers are found in communities with more money and lower class sizes.

3. When rank ordered on the basis of student outcomes, do school districts within the state perform as expected in terms of the money and school system characteristics reported in the Report Cards?

One might expect that school districts with money, better teacher salaries, enrollments which are not extreme (very large, very small), fewer oversize classes, higher attendance and high percent of upper-level Career Ladder teachers would produce the best MSO. In general, those expectations were confirmed in the regression analyses conducted in response to research question one. There are, however, outlier districts producing MSOs significantly lower or higher than could be expected. Figures 9 and 10 show these exceptions. Tables 8 and 9 however, highlight these exceptions.

In Table 8 (p 20), the nine highest and nine lowest ranked districts by MSO are profiled by their z-scores on the eight independent variables. The district producing the fourth highest MSO does not conform to expectations in at least four of eight areas. It has low CCI and APS, a high %FRL and a small %CL. It does not rate as high as other districts in the "top nine" category in several other areas. It would not be expected to be a "top nine" MSO school district, but it is.

The school district ranked number 117, fifth from the bottom in MSO in the sample of 121 school districts is also an "outlier." It has the second highest CCI z-score (2.04) for the 121 school districts, high APS, and large EPP as demonstrated by rank and z-scores. It is, however, a large school district as demonstrated by its z-score in that category (7.92).

Table 9 (p 21) data are also useful in responding to research question #3. The nine highest performing school districts (MSO) and the nine lowest performing districts were profiled among all school districts studied based on their ranks on the eight independent variables.

The positional profile reveals that the third, fourth, sixth, and eighth highest performing school districts do not conform to commonly held beliefs about school district performance (e.g., a direct, positive correlation between MSO and school system data). District #3 places 73rd in CCI among 121 districts and 94th in EPP. It is a small (*104th ranking*), rural school district with relatively few Career Ladder teachers (*103rd ranking*). However, it has proportionately high %SA (*tied for 6th position*) among 121 districts.

School district #4 has the lowest per capita income among districts in the sample (*121st ranking*). It is 110th in APS and 66th in EPP. It is also a small, rural school district (*118th ranking*) with high %FRL (*106th position*) and low %CL teachers (*107th position*). However, it is tied for 16th place %SA and only 26th in %OC, indicating fewer oversized classes than roughly four-fifths of the districts studied. The eighth highest performing

Table 8. Profile of Z-scores of Nine Highest and Nine Lowest Ranked School Districts by MSO z-score, TN; 1988-89 data.

n	OUTCOME	MONEY			SCHOOL SYSTEM				
	MSO	CCI	APS	EPP	ADM	%SA	%OC	%FRL	%CL
	121	121	121	121	121	121	110	121	121
Top 9									
RANK									
1	1.97	1.00	2.18	0.91	-0.26	0.92	0.87	1.30	1.81
2	1.40	1.44	2.67	3.64	-0.18	-0.20	1.39	0.53	2.06
3	1.26	-0.24	-0.10	-0.66	-0.42	1.79	0.59	0.46	-0.90
4	1.20	-2.00	-1.14	-0.29	-0.47	0.99	0.81	-1.39	-1.01
5	1.17	4.31	0.61	0.16	0.36	0.68	0.98	2.11	0.64
6	1.50	-0.28	-0.17	-0.27	-0.30	-0.04	-0.86	-0.16	0.38
7	1.14	-0.13	1.69	2.87	-0.31	1.71	1.34	0.46	-0.16
8	1.12	-0.24	-0.37	-0.55	-0.47	1.79	na	-0.22	1.62
9	1.11	1.00	3.66	3.24	-0.43	1.31	na	0.60	2.36
M		0.51	1.00	1.00	-0.27	0.99	0.73	0.41	0.75
Bottom 9									
113	-1.04	-0.78	-0.71	-0.45	-0.32	-0.42	0.34	-0.09	-0.21
114	-1.17	-0.35	-0.60	-0.54	-0.19	1.47	na	-2.08	-0.35
115	-1.29	-1.07	-1.31	-0.93	-0.40	-0.36	-2.65	-0.02	-1.33
116	-1.33	-0.47	-0.98	-0.10	-0.14	-1.00	0.39	-1.60	-0.40
117	-1.43	2.04	1.34	1.22	7.92	-0.44	0.78	-2.36	0.16
118	-1.55	-1.59	-1.31	-0.05	-0.34	-2.04	-1.44	-1.60	-0.60
119	-1.77	-1.03	-0.55	0.15	0.02	-2.92	-0.05	-1.53	-0.94
120	-2.14	-0.13	-1.36	-0.61	-0.14	0.01	-1.12	-3.18	-1.75
121	-2.53	-1.23	-1.20	-1.12	-0.34	-2.76	-2.65	-0.16	-1.39
M		-0.51	-0.74	-0.27	0.67	-0.94	-0.80	-1.40	-0.76

Bold = MSO z-score and category z-score *are* similar (i.e., both are either positive or negative and are greater than one).

Underline = MSO z-score and category z-scores are *not* similar (i.e., if one is a ± 1 or larger SD, the other item is a ± 1 or larger SD).

school district demonstrated a profile similar to district #4, except that its attendance was better (*tied for sixth*), and it had a higher %CL (*eighth position*).

The school district with the 6th highest MSO consistently ranked in the lower half of all districts on all factors except %CL teachers where it ranked at the bottom of the upper quartile.

The MSO factor in all of these districts is relative. These top nine are the best performing school districts in the state, but the state averages typically do not place TN schools among the best performers in the country. It is clear, however, that money is not the most critical factor in MSO in TN's "high flyers." If any factors seem to be closely associated with student outcomes more than any others, they are school district size, as a negative (ADM) and %OC (*oversized classes*) and %SA (attendance) as positive. However, there are districts that do not have the highest %SA or lowest %OC that outperform the majority of districts in the state. Other factors.

Table 9. Profile of ranks on eight variables of the nine highest and nine lowest ranked (Rk) school districts by MSO z-score, TN: 1988-89 data.

RANK n=	MONEY			SCHOOL SYSTEM				
	Rk CCI 121	Rk APS 121	Rk EPP 121	Rk ADM 121	Rk %SA 121	Rk %OC 110	Rk %FRL 121	Rk %CL 121
Top 9								
1	14	6	18	<u>64</u>	18.5	24	5.5	6
2	12	3	1	<u>50</u>	<u>73</u>	1	39	5
3	<u>73</u>	59	<u>94</u>	<u>104</u>	6.5	36	44.5	<u>103</u>
4	<u>121</u>	<u>110</u>	<u>66</u>	<u>118</u>	16.5	26	<u>106</u>	<u>107</u>
5	1	27	33	11	26.5	18	1	27
6	<u>77</u>	61	64	<u>74</u>	65	<u>92</u>	<u>84</u>	37
7	66	8	6	<u>78</u>	8	2	44.5	60
8	<u>73</u>	<u>71</u>	<u>85</u>	<u>119</u>	6.5	na	<u>87.5</u>	8
9	14	1	2	<u>108</u>	11.5	na	33	3
Bottom 9								
113	99	90	78	80	84.5	<u>44</u>	79.5	62
114	80	82	84	<u>51</u>	<u>9</u>	na	116	74.5
115	105	120	111	101	80.5	107	74	114
116	88	105	<u>48</u>	<u>44</u>	106	<u>43</u>	112.5	78.5
117	<u>3.5</u>	<u>13</u>	<u>13</u>	<u>1</u>	84.5	<u>27</u>	118	<u>48</u>
118	117	119	<u>42</u>	84	117	101	112.5	88.5
119	103	80	<u>34</u>	<u>23</u>	<u>121</u>	64	109	104
120	63	121	90	<u>45</u>	60.5	97	120.5	119
121	108	115	116	<u>87</u>	120	108	84	116

Underlined = a 60 ranking difference between the district's MSO rank and the category rank.

not present in these report cards but associated with student achievement, are operating. The factors studied account for 26.5%. What is the other 73.5%?

The analysis of the nine worst-performing districts confirms the findings on the other end of the spectrum. Some profiles among this group do not conform to commonly held beliefs or even to the patterns of the "outlier" schools with top performance rankings. District #117 ranks among the top districts in the state in all three money factors, in the top quartile (*small* %OC), and in the top half in %CL. It has high %FRL (118th position) and is fifth from the last in MSO. The factors that might contribute to low performance are the large size of the school district (1st ranking), low student attendance (ranks in the bottom third of districts) and low SES (118th in free/reduced lunches). However, other districts with similar features (*except size*) did far better in student performance (e.g., #4, except for %SA).

The findings in response to research question #3 present a mixed message. Many districts did not perform as one could have expected based on the factors studied.

4. Do the reported school district characteristics appear to represent most factors which relate to student academic achievement?

The answer to this question is clearly "no." The partial correlation and percentage of influence analyses reported in response to research question #2 (see Tables 6 and 7) indicated that the eight factors studied as independent variables accounted for only one fourth of the influence on MSO. The ranking analysis for research question #3 also suggested that in both the highest and lowest performing school districts, factors other than those reported in the report cards were at work. Almost three-fourths of whatever accounts for student academic performance (as measured here by MSO) is unaccounted for based on these report cards--apparently in contradiction to the "folk wisdom" of the day. What is the missing 3/4?

V. CONCLUSIONS AND IMPLICATIONS OF THE STUDY

Investigators developed a fifth research question as a means of trying to frame conclusions and implications in a useful way:

5. How might the findings of this study inform educational policy and policymakers at the state and local levels?

Several points seem clear. "Good" inputs to the educational process (*money, small classes, good community, etc.*) do not guarantee high student achievement. If we want student achievement, we might study outputs (outcomes) not inputs and, following "effective school" methods, try to determine "correlates". Inputs commonly assumed to be associated with outputs account for only minor variation in performance outcomes (just over one-fourth). Another possibility is that the inputs are important, but that the output (MSO or fairly low-level testing) is inadequate. Further, the individual association of most of these factors (with the exception of attendance) is minor; debate over and attention to any one in isolation may be a wasteful activity. If we want to impact student performance, a comprehensive approach which addresses more critical factors is needed.

Policymakers need to consider these points carefully. In recent years, there have been attempts to compromise comprehensive educational reform packages by putting major emphasis and resources into one or two strongly lobbied dimensions of some comprehensive plan. While this approach may soothe feelings, it seems to do little to improve student achievement.

Another conclusion of the study: we are not yet talking about, dealing with and reporting many important influences on student outcomes. What are they? We need more research into the cause and effect relationship.

On the other hand, we may know more than we're measuring and reporting. It is currently popular to talk about restructuring schools, teaching and learning conditions and parent-school relationships. Some educators suggest and have some research to support the suggestion ("soft data") that student motivation and self-

concept, student and educator attitudes, school climate, teaching strategies, administrator and teacher styles and parent involvement in schools must change before much change will be seen in student academic achievement. Those factors can be rather easily measured and reported, as innovative schools such as those in the RJR Nabisco Foundation's Next Century Schools Project, the Coalition of Essential schools and other such endeavors are showing. How much influence do some of these other factors contribute to MSO? On the output side, there is serious attention to alternative forms of assessment (see Kappan, 1991). Perhaps the typical outcome (e.g., the MSO) does not measure what schools are doing.

Assessing what students know and are able to do is a problem. The investigators used available, reported test results in these analyses. Therefore, the findings are only as good as the test results. There is great debate about the value of present tests—both their content and format, and there is great demand for new and different assessments. If the test results used to form the dependent variable in this study (MSO) were not measuring the right things or were not measuring them validly and reliably, all other findings are of little value. We (the investigators) have no basis upon which to challenge any of the tests currently in use in Tennessee. One statistical eccentricity noted as the various analyses were performed was that correlations between the factors studied and MSO were usually stronger when the single outcome measure of achievement was a national test: The Stanford Achievement Test, Task II, rather than a state-specific test—the Basic Skills or Proficiency test (*BSF* or *TPT*).

These results should be considered tentative. This is a study of relationships; we make no claim for "generalizability," but we encourage people to consider similarities in these data and in the report card use in their own situations. The release of "The Report Card" may generate considerable attention—in smaller news markets results may warrant front-page notice. Perhaps state education officials use report card results as a basis for deciding that a district is at risk, or even needs external help (*i.e., on 26%?*).

In spite of their tentative nature, these findings are instructive. At least based on the results for this study, the media hyperbole and hoopla surrounding report cards are vastly over-rated as report cards deal with an underwhelming part of schooling. If you wanted to know all about something (100%) and some strategy provided you about 25% of the information, would you continue to emphasize that 25%, or would you want to find the missing 75%? Would you settle for more of the same (*as in much "reform"*) or would you begin an earnest quest for new ideas? Perhaps that quest should be the reforms.

Finally, a note of caution for those contemplating, creating or modifying report cards on schools. If the entries on those report cards are similar to those investigated in this study, they may provide interesting statistics but only a small amount of information useful in improving education. Further, whatever information is entered into the report card is of minimal use until additional analyses such as those conducted in this study are

performed. Since the commonly used and reported measures seem to account only for about a quarter of the variance relative to MSO, isn't it time to find out where the other three-fourths of the variance is lurking? Why do we bet so much on 25 percent? The more attention directed at these eight factors, the less likely that there will be a serious quest for the missing three-fourths. Who will break with tradition? Now is the time!

VII. INTERESTING QUESTIONS

If we insist on using report cards, or "Wall Charts", here are some interesting questions:

1. Widget City (Tables 1 and 2) is the top MSO school district in TN for 1988-1989. Using this available information, can a building level/central office administrator, teacher, supervisor, parent, or a state department official make intelligent outcome, administrative, financial, or policy decisions?
2. What are some other identifiable, measurable indicators that might be added to a report card to evaluate student outcome?
3. The influence of special-program finding on the lack of positive correlations between money factors and MSO is unclear. A district with high special-program (*special education, vocational education*) will have high EPP but might not have high MSO. What difference will such analysis make on relationships between EPP and MSO?

VIII. A FOOTNOTE

More refined analyses of these data can be conducted. It is not clear what effects outlier districts scoring very high or very low on any factor have on statewide results and trends. Some relationships may not be linear, but may be curvilinear. Additional analyses will be reported subsequently.

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